

**I CLAIM:**

1. A fuel cell system comprising:  
a plurality of fuel cells, each including a fuel inlet, an oxidant inlet, a fuel side product outlet and an oxidant side product outlet;  
a common fuel supply line interconnecting said fuel inlets;  
a common oxidant supply line interconnecting said oxidant inlets; and  
a fuel side product purging mechanism coupled to said fuel side product outlets and including fuel side product valving structure operable to selectively and independently open each of said fuel side product outlets.
2. A fuel cell system as set forth in claim 1, comprising an oxidant side product purging mechanism coupled to said oxidant side product outlets and including oxidant side product valving structure operable to selectively and independently open each of said oxidant side product outlets.
3. A fuel cell system as set forth in claim 1, wherein said fuel side product valving structure includes a separate fuel side product valve for each fuel side product outlet.
4. A fuel cell system as set forth in claim 2, wherein said oxidant side product valving structure includes a separate oxidant side product valve for each oxidant side product outlet.
5. A fuel cell system as set forth in claim 4, wherein said fuel side product valving structure includes a separate fuel side product valve for each fuel side product outlet.
6. A fuel cell system as set forth in claim 1, wherein said fuel side product valving structure includes a stationary element and a moveable element, said stationary element having an external surface and a plurality of fuel side product ports extending therethrough, said fuel

side product ports each having one end connected to a respective fuel side product outlet and a second end that opens through said external surface, said moveable element having a valve surface in engagement with said external surface, said moveable element having at least one fuel side product collection conduit that extends therethrough and opens at said valve surface, said moveable element being moveable relative to said stationary element so as to register said conduit with the second end of a selected one of said ports.

7. A fuel cell system as set forth in claim 6, wherein said elements are each disc-shaped, said surfaces are generally planar, and said moveable element is rotatable about an axis which is generally perpendicular to the plane of said surfaces.

8. A fuel cell system as set forth in claim 2, wherein said oxidant side product valving structure includes a stationary element and a moveable element, said stationary element having an external surface and a plurality of oxidant side product ports extending therethrough, said oxidant side product ports each having one end connected to a respective oxidant side product outlet and a second end that opens through said external surface, said moveable element having a valve surface in engagement with said external surface, said moveable element having at least one oxidant side product collection conduit that extends therethrough and opens at said valve surface, said moveable element being moveable relative to said stationary element so as to register said conduit with the second end of a selected one of said ports while other ports are blocked by said valve surface.

9. A fuel cell system as set forth in claim 8, wherein said elements are each disc-shaped, said surfaces are generally planar, and said moveable element is rotatable about an axis which is generally perpendicular to the plane of said surfaces.

10. A fuel cell system as set forth in claim 2, wherein said fuel side product valving structure and said oxidant side product valving structure together include a stationary element and a moveable element, said stationary element having an external surface and a plurality of ports extending therethrough, said ports each having one end connected to a respective outlet and a second end that opens through said external surface, said moveable element having a valve surface in engagement with said external surface, said moveable element having at least one fuel side product collection conduit and one oxidant side product collection conduit, each of which extends through the moveable element and opens at said valve surface, said moveable element being moveable relative to said stationary element so as to register said fuel side product collection conduit with the second end of a port which is connected to the fuel side product outlet of a chosen cell and so as to register said oxidant side product collection conduit with the second end of another said port which is connected to the oxidant side product outlet of said given cell.

11. A fuel cell system as set forth in claim 10, wherein said elements are each disc-shaped, said surfaces are generally planar, and said moveable element is rotatable about an axis which is generally perpendicular to the plane of said surfaces.

12. A fuel cell system comprising:

a plurality of fuel cells, each including a fuel inlet, an oxidant inlet, a fuel side product outlet and an oxidant side product outlet;

a common fuel supply line interconnecting said fuel inlets;

a common oxidant supply line interconnecting said oxidant inlets; and

an oxidant side product purging mechanism coupled to said oxidant side product outlets and including oxidant side product valving structure operable to selectively and independently open each of said oxidant side product outlets.

13. A fuel cell system as set forth in claim 12, wherein said oxidant side product valving structure includes a separate oxidant side product valve for each oxidant side product outlet.

14. A fuel cell system as set forth in claim 12, wherein said oxidant side product valving structure includes a stationary element and a moveable element, said stationary element having an external surface and a plurality of oxidant side product ports extending therethrough, said oxidant side product ports each having one end connected to a respective oxidant side product outlet and a second end that opens through said external surface, said moveable element having a valve surface in engagement with said external surface, said moveable element having at least one oxidant side product collection conduit that extends therethrough and opens at said valve surface, said moveable element being moveable relative to said stationary element so as to register said conduit with the second end of a selected one of said ports while other ports are blocked by said valve surface.

15. A fuel cell system as set forth in claim 14, wherein said elements are each disc-shaped, said surfaces are generally planar, and said moveable element is rotatable about an axis which is generally perpendicular to the plane of said surfaces.

16. A fuel cell system comprising:

a plurality of fuel cells, each including a fuel inlet, an oxidant inlet, a fuel side product outlet and an oxidant side product outlet;

a common fuel supply line interconnecting said fuel inlets;

a common oxidant supply line interconnecting said oxidant inlets; and  
a common product purging mechanism coupled to said outlets and including valving structure operable to selectively and independently open the outlets of a given cell.

17. A fuel cell system as set forth in claim 16, wherein said valving structure includes a separate valve for each outlet.

18. A fuel cell system as set forth in claim 16, wherein said valving structure includes a stationary element and a moveable element, said stationary element having an external surface and a plurality of ports extending therethrough, said ports each having one end connected to a respective outlet and a second end that opens through said external surface, said moveable element having a valve surface in engagement with said external surface, said moveable element having a fuel side product collection conduit and an oxidant side product collection conduit that extend therethrough and open at said valve surface, said moveable element being moveable relative to said stationary element so as to register said conduits with the second ends of the ports which are connected to the outlets of the given cell.

19. A fuel cell system as set forth in claim 18, wherein said elements are each disc-shaped, said surfaces are generally planar, and said moveable element is rotatable about an axis which is generally perpendicular to the plane of said surfaces.

20. A fuel cell system as set forth in claim 19, wherein second ends of ports that are connected to fuel side product outlets and said one fuel side product collection conduit are arranged in a first circle that is concentric with said axis and has a first diameter, and second ends of ports that are connected to oxidant side product outlets and said oxidant side product collection

conduit are arranged in a second circle that is concentric with said axis and has a second diameter that is different than said first diameter.

21. A method for operating a fuel cell system made up of a plurality of fuel cells, each including a fuel inlet, an oxidant inlet, an openable and closeable fuel side product outlet and an openable and closeable oxidant side product outlet, said method comprising:

supplying fuel to said fuel inlets;

supplying an oxidant to said oxidant inlets; and

selectively opening the outlets of a given cell to purge fuel side product and oxidant side product from said given cell.

22. A method as set forth in claim 21, comprising selectively keeping the outlets of other cells in a closed condition while one or more outlets of the given cell are open.

23. A method as set forth in claim 21, wherein said step of selectively opening the outlets of a given cell is conducted in such a way that the outlets of the given cell are open at the same time so as to simultaneously purge fuel side product and oxidant side product from the given cell.

24. A method as set forth in claim 23, comprising selectively keeping the outlets of other cells in a closed condition while one or more outlets of the given cell are open.

25. A method as set forth in claim 21, 22, 23 or 24, comprising closing the outlets of said given cell and selectively opening the outlets of a second cell to purge fuel side product and oxidant side product from said second cell.

26. A method as set forth in claim 25, comprising selectively keeping the outlets of other cells in a closed condition while one or more outlets of the second cell are open.



33. A method as set forth in claim 30, comprising closing the outlets of the cells of said given group of cells and opening the outlets of each cell of a second group of cells to purge fuel side product and oxidant side product from each of the cells of said second group of cells.

34. A method as set forth in claim 33, comprising selectively keeping the outlets of other cells in a closed condition while the outlets of the cells of the second group of cells are open.

35. A method as set forth in claim 29, wherein said step of selectively opening the outlets of each cell of a given group of cells is conducted in such a way that the fuel side product outlets of the cells of said given group of cells are all open at the same time so as to simultaneously purge fuel side product from each of the cells of said given group of cells.

36. A method as set forth in claim 29, wherein said step of selectively opening the outlets of each cell of a given group of cells is conducted in such a way that the oxidant side product outlets of the cells of said given group of cells are all open at the same time so as to simultaneously purge oxidant side product from each of the cells of said given group of cells.

37. A method as set forth in claim 29, wherein said step of selectively opening the outlets of each cell of a given group of cells is conducted in such a way that the product outlets of the cells of said given group of cells are all open at the same time so as to simultaneously purge fuel side product and oxidant side product from each of the cells of said given group of cells.

38. A method as set forth in claim 31, wherein said step of selectively opening the outlets of each cell of a second group of cells is conducted in such a way that the fuel side product outlets of the cells of said second group of cells are all open at the same time so as to simultaneously purge fuel side product from each of the cells of said second group of cells.



39. A method as set forth in claim 31, wherein said step of selectively opening the outlets of each cell of a second group of cells is conducted in such a way that the oxidant side product outlets of the cells of said second group of cells are all open at the same time so as to simultaneously purge oxidant side product from each of the cells of said second group of cells.

40. A method as set forth in claim 31, wherein said step of selectively opening the outlets of each cell of a second group of cells is conducted in such a way that the product outlets of the cells of said second group of cells are all open at the same time so as to simultaneously purge fuel product and oxidant product from each of the cells of said second group of cells.

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